IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)
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Frank WESTENDORF et al.	) Group Art Unit: 2165
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Filed: March 31, 2004	)
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For: SYSTEMS AND METHODS FOR	) Confirmation No.: 4926
AUTOMATED DATA OBJECT	)
PROCESSING	)

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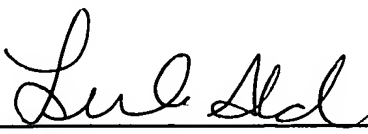
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CLAIM FOR PRIORITY

Under the provisions of Section 119 of 35 U.S.C., Applicants hereby claim the benefit of the filing dates of PCT Patent Application Number PCT/EP03/03334, filed on March 31, 2003 and PCT Patent Application Number PCT/EP03/04518, filed on April 30, 2003, for the above identified United States Patent application.

In support of Applicants claim for priority, certified copies of the priority applications are filed herewith.

Respectfully submitted,

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Dated: April 11, 2006   By: _____

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Les documents fixés à cette attestation
sont conformes à la version initialement
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Patentanmeldung Nr.
Patent application no.
Demande de brevet n°

PCT/EP 03/03334

Blatt 2 der Bescheinigung
Sheet 2 of the certificate
Page 2 de l'attestation

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Anmelder: Applicant(s): Demandeur(s):	1. SAP Aktiengesellschaft - Walldorf, Germany 2. WESTENDORF, Frank - Ubstadt-Weiher, Germany 3. PEDERSEN, Bent Foss - Jyllinge, Denmark
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Sheet No. ...3...

Box No. V DESIGNATION OF STATES	*Mark the applicable check-boxes below: at least one must be marked.*

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SAP Aktiengesellschaft

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SAP 009 P-WO

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A method and a computer system for automated data object processing

5

Field of the invention

10 [0001] The present invention relates to the field of automated data object processing and more particularly to the field of automated processing of data objects forming process chains of linked data objects in a data base of a computer system.

15

Description of the Related Art

[0002] There are many cases and situations in which
20 data objects contained in a data base are linked to each other so as to form process chains, i.e. the data objects linked to each other describe a development or the history of a process or an order of events. In this context, the term "process chain" does not only describe
25 a mere one-dimensional sequence of data objects but also more-dimensional and complex chainings, networkings or meshings, i.e. a complex branch construct.

[0003] One example for data objects forming process
30 chains of linked data objects is in the field of calculation and remuneration of commission cases. Commission cases occur in the context of various business

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fields where employees or agents receive bonus or
commission payments on the basis of achieved objects,
such as for example in the field of insurance companies
where an employee or agent receives commission payments
5　when he sells an insurance policy etc. However, there are
many other areas in sales and services where commission
cases are handled. In situations with a complex
environment and/or long-term contracts, a whole history
of events (commission cases) develops over time which
10　leads to a situation with several data objects, each of
which describes a commission case and which are based one
on the other over time in a causal relation. In the most
simple situation, this relation is a one-dimensional
process chain of at least two data objects. As an example
15　for this, Figure 1 illustrates a commission case chain
with three commission cases forming a one-dimensional
process chain with the oldest case (Case 1) depicted on
the left hand side and the younger cases (Case 2 and Case
3) placed subsequently along a time axis showing to the
20　right hand side of Figure 1. Arrows between the
respective cases indicate the succession in time.

　　　[0004]　As can be seen from Figure 1, each commission
case contains respective sub objects which comprise
25　information of what has been done in the commission case.
As sub objects are independent of the case, they play an
important rule when a chain in commission cases has to be
updated. The situation illustrated in Figure 1 could, for
example, stand for a life insurance contract which was
30　signed at a given date (Case 1). This led to a commission
payment to the employee who sold that life insurance. At
a later date, the amount covered by this life insurance

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was raised which led to a further commission payment to
the relevant employee (who could be the same employee as
in case 1 or another employee, e.g. a successor to the
employee who sold the insurance in the first place).
5   Again later, the insurance contract was changed from a
risk insurance (term policy) into a capital-sum life
insurance which led to a third commission payment.

[0005]   Other, more complex situations exist. For
10   example in the case of health insurances, there could be
the case of two single persons with own health insurance
contracts and which might comprise additional benefit
agreements (getting married an having children with
contracts get emerged, cancelled, creating subcontracts
15   and eventually new contracts emerging from subcontracts
when the children are grown up). Obviously, there are
(basically) no limits to complexity.

[0006]   In a situation where a commission case has to
20   be updated, the whole chain of commission cases has to be
updated, too, as remuneration amounts can influence other
remuneration amounts as the remuneration amounts depend
on the remuneration they correct/influence, cases with
such remunerations have to be considered when a chain of
25   commission cases is updated. In such a case, sub objects
play an important rule as they are independent of the
case. However, in the systems known from the prior art,
it is only possible to update the youngest of the
commission cases, i.e. the commission case last posted in
30   the commission case chain.

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Summary of the Invention

[0007]   It is therefore an object of the invention to
provide a data object processing system which allows for
fast and reliable updating of process chain data objects
even in very complex process chain branch structures.
More particularly, it is an object of the invention to
provide a data object processing system in which the data
objects are consistent after processing of an update.
This object is achieved by proposing a method for
automated data object processing with the features of
claim 1 and a computer system for automated data object
processing with the features of claim 7.

[0008]   Accordingly, a computing unit of a computer
system comprises a selection module, a preparation module
and a process module, as well as a data base containing
data objects forming process chains of linked data
object, the selection module allowing for selection of a
data object among the data objects contained in the data
base, the preparation module identifying, on the basis of
the selected data object, at least one process chain
containing the selected data object and determining all
of the data objects of the data base which are linked
with the selected data object in causal relation, and the
process module resetting the determined data objects,
executing the desired processing of the selected data
object and recalculating consecutively the determined
data object reset before and being in causal relation
with the selected data object.

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[0009] The method according to the invention comprises the steps of

5   after a data object to be processed has been selected, identifying at least one process chain containing the selected data object to be processed;

    determining all of the data objects which are linked with the selected data object in causal relation;

10

    processing the determined data objects and the initial data object.

    Advantageously, the step of processing comprises

15

    subsequently resetting or cancelling one determined data object after the other;

    executing the desired processing of the selected data

20   object; and

    recalculating, if necessary (i.e. if the determined data object was not cancelled), consecutively the determined data objects reset in the resetting step being

25   in causal relation with the selected data object.

    [0010] Preferably, the processing steps are configurable by switches, e.g. a user could define that resetting and recalculation of a determined data object

30   is replaced by cancellation).

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[0011] With the invention, it is possible to handle automatically deep and complex networks of data objects such as commission cases within one single process to resolve pending case queues or to recalculate them in
5   changed context.

[0012] With the invention, it is possible to handle very large amounts of data. It differentiates multiple processing types, supports parallel administration of
10 processes, protects mass processing against each other and against single processing.

[0013] Advantageously, the data objects contain a time index, and the resetting of the determined data
15 objects (as executed by the process module) starts with the data object containing the most resent time index and steps back consecutively to the selected data object.

[0014] The invention also covers a computer program
20 with program coding means which are suitable for carrying out a process according to the invention as described above when the computer program is run on a computer. The computer program itself as well as stored on a computer-readable medium is claimed.
25

[0015] Further features and embodiments of the invention will become apparent from the description and the accompanying drawings.

30   [0016] It will be understood that the features mentioned above and those described hereinafter can be used not only in the combination specified but also in

other combinations or on their own, without departing from the scope of the present invention.

[0017] The invention is schematically illustrated in
5   the drawings by means of an embodiment by way of example
and is hereinafter explained in detail with reference to
the drawings. It is understood that the description is in
no way limiting on the scope of the present invention and
is merely an illustration of a preferred embodiment of
10   the invention.

Brief description of the Drawings

15   [0018]   In the drawings,

Figure 1 is a schematic illustration of a
conventional data object chain with three data objects,
the data objects describing commission cases;
20

Figure 2 is a schematic view of a data object
processing computer system according to the invention;

Figure 3 is a schematic block diagram depicting the
25   three modules of the computer system according to Figure
2;

Figure 4 illustrates by means of a block diagram the
processing of linked data object process chains (case
30   chains) according to the invention.

Detailed Description

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[0019]   Figure 2 shows a schematic block diagram representation of a data object processing computer system 10 according to the present invention. Computer
5   system 10 comprises a server or computing unit 12 connected with at least one input/output means 18. A software solution is installed on computing unit 12 comprising three modules, namely a selection module 16, a preparation module 14 and a process module 22. The
10   computing unit 12 is connected to a data base 20 on which a plurality of data objects is stored.

[0020]   Figure 3 shows the succession in operation of the three modules selection modules 17, preparation
15   module 14 an process module 22 described above.

[0021]   The invention is now described in more detail in connection with commission cases by ways of example only. It is to be understood that the invention can be
20   employed in any other field in which subsequent data objects are linked to each other in a causal relation and influence there contents and/or results.

[0022]   According to the invention selection module
25   16 selects one or more commission cases that are to be processed, preparation module 14 prepares the cases by finding additional cases, grouping and sorting them, and process module 22 processes the cases determined before.

30   [0023]   Selection module 16 is a module created depending on the context of its use. The selection module 16 could be a report that is based on some selection

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criteria that select the cases or it could be a report
with a user interface that allows the user to select
cases based on certain selection criteria, such as a case
ID or all cases posted in a certain period of time, or
5   the like. The selected cases are then transferred to the
preparation module 14.

[0024] The preparation module 14 requires a selected
list of commission cases as input which is provided by
10 the selection module 16. The list of selected cases
(selected data objects) is referred to as the list of
initial cases (or initial data objects). The preparation
step performed in the preparation module 14 needs to
locate additional required cases that need to be
15 processed before the initial selected cases can be
processed. For example, in the simple case illustrated in
Figure 1, if case 1 is selected as the initial case, the
preparation module 14 would determine cases 3 and 2 to be
processed before case 1 can be processed.
20

[0025] Advantageously, the cases determined by the
preparation module 14 are grouped and sorted. The result
of this grouping and sorting could be groups of sorted
cases that can later be processed independently. The
25 groups are preferably disjoined.

[0026] The result of the preparation in preparation
module 14 is a task list based on the group and sorted
commission cases which contains a list of constructions
30 on how to handle the cases and which forms the basis for
the process module 22 to process the determined
commission cases. Preferably, it is possible to add a new

case to the list of initial selected commission cases,
and then continue the preparation in the preparation
module.

5   [0027] Also, the preparation module 22
advantageously provides program interfaces to maintain
the initial list of commission cases and to start the
preparation.

10   [0028] Finally, the process module 22 processes the
task list generated and provided by the preparation
module 14. Preferably, it is possible to start several
processing tasks in parallel, each process processing one
task list.

15

[0029] The preparation module 14 and/or the process
module 22 preferably each comprise at least one
interface. Interfaces for the preparation module 14 are,
for example, i) adding a commission case to the list of
20   initial selected commission cases that have to be
processed; ii) starting the preparing process (creating
the groups, sorting the cases and creating the task
lists.) Interfaces for the processing module 22 comprise
for example i) maintaining the task list and a list with
25   overall information about the task list; and ii)
controlling a possible parallel process.

[0030] It is an important feature of the invention
that, when a commission cases processed, both
30   subsequently posted commission cases in the commission
case chain, cases that contain rebundled sub objects and

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commission cases with correction remunerations can be taken into account.

[0031]   Referring now to Figure 4, a commission case chain 30 consisting of four commission cases 1 to 4. As can be seen from the time axis shown on the lower right hand side of Figure 4, case 1 is the oldest case in commission case chain 30 and case 4 is the youngest case.

[0032]   Two further commission case chains 32 and 34 are shown in Figure 4, commission case chain 32 comprising cases Y1 to Y3 and commission case chain 34 comprising cases Z1 to Z3. Case Y1 of commission case chain 32 is older than case 1 of commission case chain 30 and case Y2 of commission case chain 32 is younger than case 1 of commission case chain 30. Similarly, case Z1 of commission case chain 34 is older than case 3 of commission case chain 30 and case Z2 of commission case chain 34 is younger than case 3 of commission case chain 30.

[0033]   When looking at case 3, it contains a sub object as 3 which is rebundled to case Z2, i.e. case 3 and case Z2 are linked in causal relation. As case Z2 is younger than case 3, this means that case Z2 has to be considered if any of the cases 1 to 3 is selected as an initial case and has to be handled/processed because the valuation for the sub object as 3 could change in case 3 and as a result, the valuations in the cases Z2 and Z3 could change, too.

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[0034]   When looking at case Y2, it contains a sub object SY2 which is rebundled to case 2, i.e. cases Y2 and 2 are linked in causal relation. However this rebundling is of no importance as the valuations in case
5   Y2 (which is older than case 2) will not change as a result of an update/processing of case 2.

[0035]   Figure 5 shows a table containing a list of the tasks which have to be processed depending on which
10   one of the cases 1 to 4 of commission case chain 30 is selected as an initial case.

[0036]   The first row identifies the most simple occurrence, i.e. a selection of case 4. As case 4 is the
15   youngest case in commission case chain 30 and not rebundled or linked to any other case, the processing of case 4 comprises parking or locking of case 4 and resolving it.

20   [0037]   Should case 3 be selected as initial case, case 4 is parked first and then cases Z3 and Z2 are parked as sub object as 3 is rebundled from case 3 to case Z2. Afterwards, the cases 3, Z2,Z3 and 4 are resolved.
25

[0038]   If case 2 is selected as initial case, cases 3 and 2 are parked first. Then, case 2 is resolved, and then case 3 is resolved as described above.

30   [0039]   If case 1 is selected as initial case, case 2 has to be parked first as described above. Then case 1 is resolved, and then case 2 is resolved as described above.

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[0040]   If there is a remuneration amount in the
current case that is corrected by a remuneration amount
calculated in another case, that case has to be
5   considered, too. The reason is that if the remuneration
in the current commission case changes then the
correction remuneration might change, too, and therefore
the commission case has to be taken into account. This
cannot be handled by the selection module 16 as the two
10   cases in question have to be processed in the same task
list. If the cases are provided by the selection module
they are both treated as initial commission cases and by
default they end up in different task lists.

15   [0041]   Figure 6 shows four situations of
remuneration corrections, commission case 2 being the
case examined.

[0042]   The situations indicated with dashed arrows
20   and reference numerals ① and ② are both situations where
a remuneration in case 2 corrects/influences a
remuneration from another commission case, i.e. case 1 in
situation ① and case Y2 in situation ②. These situations
do not have to be dealt with because the results of cases
25   1 and Y2 do not change when case 2 changes. The
situations depicted by dashed arrows with reference
numerals ③ and ④ indicate situations where a
remuneration amount is corrected by a remuneration amount
that is part of another commission case, i.e. cases 3 in
30   situation ④ and case Z1 in situation ③. If the
remuneration amount in commission case 2 changes, then
the correcting remuneration amount could change too.

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Therefore, these cases have to be dealt with in the same
task list and they have to be located/determined during
the preparation in preparation module 14.

5   [0043] As already described above, the process
according to the invention consists of the three modules
selection module 16, preparation module 14 and process
module 22. Selection module 16 provides preparation
module 14 with the one or more selected cases. After the
10   preparation module 14 has determined additional cases,
grouped and sorted the cases and generated the task list,
the task list is provided to process module 22 and
processed by said module.

15   [0044] In detail, preparation module 14 receives a
list of initial commission cases provided by selection
module 16, which list contains the commission cases that
need to be processed. The preparation module 14 then
performs the following steps of locating/determining and
20   grouping additional cases, sorting cases inside a group
and generating a task list. The step of locating consists
in locating additional commission cases that need to be
processed before the initial selected case(s) can be
processed. All additional commission cases are placed in
25   the same group as the initial case. The commission cases
are then sorted into the right order within a given group
in order to ensure that the cases are processed in the
correct order.

30   [0045] The sorting step is illustrated in Figure 7.
Figure 7 again shows commission case chains 30 and 34 of
Figure 4, case 3 of commission case chain 30 being linked

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to case Z2 of commission case chain 34 due to the
rebundled sub object as 3. The situation shown in Figure
7 corresponds to case 1 of commission case chain 30 being
selected as initial case. In the first step of

5 preparation module 14, the additional cases 2, 3, 4, Z2
and Z3 where determined as cases to be processed. Case Z1
not having to be processed as it is older than case 3 and
thus older than the linkage between case 3 and case Z2,
and there is no influence from a change of case 3 or case

10 Z2 on case Z1 (cf Figure 5).

[0046]   In the next step the cases are sorted in an
order in which they can be processed, i.e. first parked
and then resolved. The sort order is indicated in Figure

15 7 by means of numbers 1 to 6 in squares. As can be seen
from Figure 7, case Z2 is the first case parked, then
case 4 is parked, followed by case Z2 and cases 3 to 1.
This corresponds to the "age" of each case, the age of a
case being advantageously determined by a time index

20 contained in each data object. Thus, the sort order
indicated in Figure 7 starts with the data object
containing the most recent time index (here: case Z3) and
then steps back consecutively to the selected data object
case 1. When resolving or recalculating the cases, the

25 given sort order is processed in reverse order, i.e. case
1 is processed first, followed by cases 2 and 3, then
case Z2, followed by cases 4 and Z3.

[0047]   Alternatively, another sort order could be to
30 start with the most recent, i.e. youngest case in the
direct line of the selected case which would be case 4 in
the situation shown in Figure 7, followed by the

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subsequent order cases in the same line except such an
older subsequent case would be linked to another line.
This is the situation for case 3 in Figure 7 being linked
to case Z2 of the line of commission case chain 34.

5   Therefore, case 3 is not the next case in the sort order
but the most recent case in the parallel commission case
chain 34 which is case Z3, followed by all the subsequent
older cases until the case is reached which is linked to
the previous line or chain. Then the sort order is

10   continued in the initial line, i.e. with cases 3 to 1.
This sort order is given in row 4 of Figure 5. Obviously,
sorting is illustrated by means of rather low complex
process chains, but it should be obvious that the
principles laid down above according to the invention can

15   be applied to much more complex data object chain
networks with a plurality of links due to rebundled sub
objects.

[0048]   As a next step, the task list to be provided
20   to the process module 22 is generated in preparation
module 14 based on the grouped and sorted list of
commission cases. The complete task list is illustrated
in Figure 8, the numbers depicted in Figure 8 giving the
previously described order of parking and resolving the
25   cases.

[0049]   In the example of Figure 8, case Z3 is part
first, then cases 4, Z2, 3, 2 and finally case 1. Case 1
is resolved and then the rest of the cases are resolved
30   in the reverse order in which they were parked.

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[0050] The order of the parking is the same as the
order of the sorted cases of Figure 7. The commission
cases are added to the task list and signed the action
park, except for the initial case which is signed the
5   action *park initial.* The cases are then copied in the
reverse order to the task list and at the same time
assigned the action *resolve,* except for the initial case
which is signed the action *resolve initial.*

10   [0051] Obviously, more than one data object can be
selected as initial case and therefore, a grouped list
can comprise more than one initial case which also
applies to the task lists so that the actions *park
initial* and *resolve initial* can occur more than once in a
15   task list.

[0052] The process module 22 then processes the
cases as specified in the task list. If more than one
task list exists, each disjoined, it is possible to
20   process two or more task lists in parallel.

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5   **CLAIMS**

1.   A method for automated processing of data objects
forming process chains of linked data objects in a data
10   base of a computer system (10) comprising the steps of
after at least one initial data object to be processed
has been selected, identifying at least one process chain
(30, 32, 34) containing the selected data object to be
processed;
15   determining all of the data objects which are linked
with the selected data object in causal relation;
processing the determined data objects and the initial
data object.

20   2.   A method according to claim 1, wherein the step
of processing comprises
resetting the determined data objects;
executing the desired processing of the initial data
object; and
25   recalculating consecutively the determined data objects
reset in the resetting step being in causal relation with
the initial data object.

3.   A method according to claim 2, wherein the step
30   of processing comprises alternatively to the steps of
resetting and recalculating the step of cancelling a
determined data object.

4.   A method according to any one of claims 1 to 3,
35   wherein the data objects contain a time index and wherein

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the processing of the determined data objects starts with the data object containing the most recent time index and steps back consecutively to the selected data object.

5   5.   A method according to any one of claims 1 to 4, wherein all data objects are locked from access upon selection of a data object until termination of the step of processing.

10   6.   A method according to any one of claims 1 to 5, wherein the step of determining includes grouping and sorting of the determined data objects.

7.   A computer system for automated processing of 15   data objects comprising

a computing unit (12); and

a data base (20) containing data objects forming process chains (30, 32, 34) of linked data objects;

the computing unit (12) further comprising

20   a selection module (16) allowing for selection of at least one initial data object;

a preparation module (14) for automatically identifying at least one process chain (30, 32, 34) containing the initial data object to be processed and for determining all 25   of the data objects which are linked with the selected data object in causal relation;

a process module (22) for processing the determined data objects and the initial data object.

30   8.   A computer system according to claim 7, wherein processing in the process module (22) comprises resetting the determined data objects, executing the desired processing of the initial data object and recalculating consecutively the determined data objects reset in the

- 3 -

resetting step being in causal relation with the initial data object.

9.   A computer system according to claim 8, wherein processing in the process module (22) comprises cancelling a determined data object alternatively to resetting and recalculating.

10.   A computer system according to any one of claims 7 to 9, wherein the data objects contain a time index and wherein the resetting of the determined data objects executed by the process module starts with the data object containing the most recent time index and steps back consecutively to the selected data object.

11.   A computer system according to any one of claims 5 to 10, further comprising a locking module for locking all data objects from access upon selection of a data object via the selection module (16) until termination of the recalculation executed by the process module (22).

12.   A computer system according to any one of claims 7 to 11, wherein the preparation module (14) provides for grouping and sorting of the determined data objects.

13.   A computer program product with a computer-readable medium and a computer program stored on the computer-readable medium with program coding means which are suitable for carrying out a method according to any one of claims 1 to 6 when the computer program is run on a computer.

14.   A computer program with program coding means which are suitable for carrying out a method according to

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any one of claims 1 to 6 when the computer program is run
on a computer.

15.   A computer-readable medium with a computer
program stored thereon, the computer program comprising
program coding means which are suitable for carrying out a
method according to any one of claims 1 to 6 when the
computer program is run on a computer.

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5   **ABSTRACT**

        A method and a computer system for automated processing
of data objects, the computer system comprising
10   a computing unit (12); and
        a data base (20) containing data objects forming
process chains (30, 32, 34) of linked data objects;
        the computing unit (12) further comprising
        a selection module (16) allowing for selection of at
15   least one initial data object;
        a preparation module (14) for identifying at least one
process chain containing the initial data object to be
processed and for determining all of the data objects which
are linked with the selected data object in causal
20   relation;
        a process module (22) for processing the determined
data objects and the initial data object, the processing
preferably comprising resetting the determined data
objects, executing the desired processing of the initial
25   data object and recalculating consecutively the determined
data objects reset in the resetting step being in causal
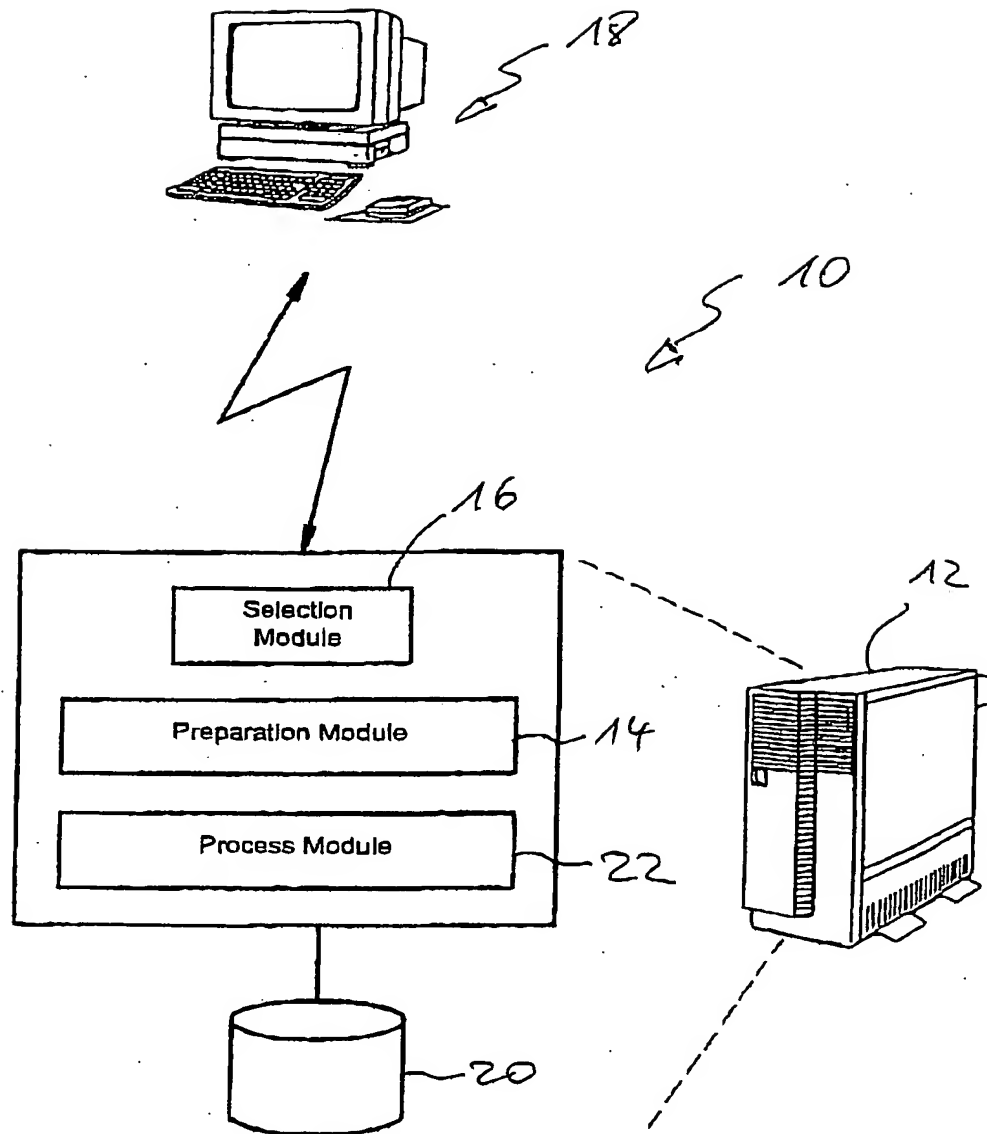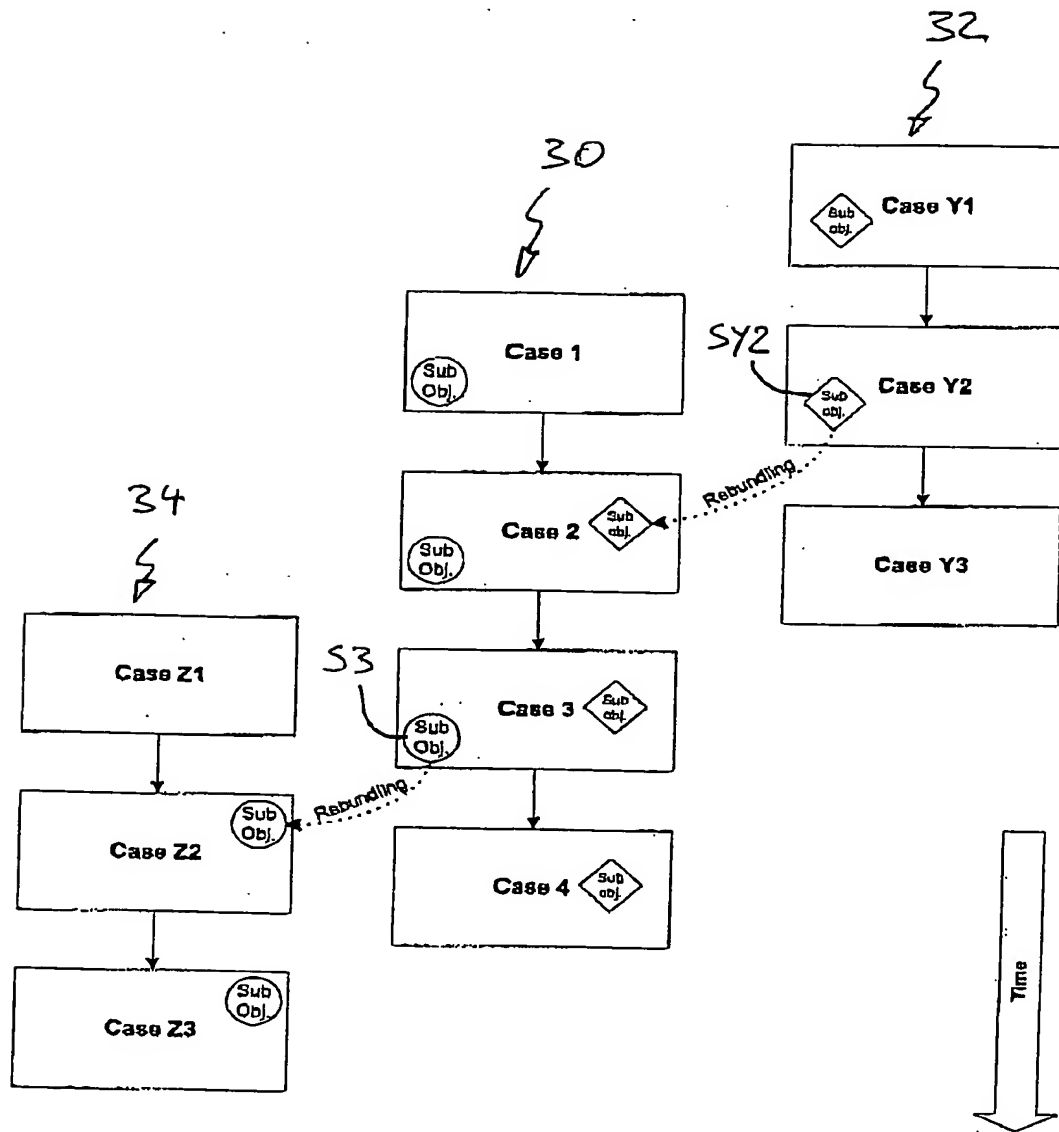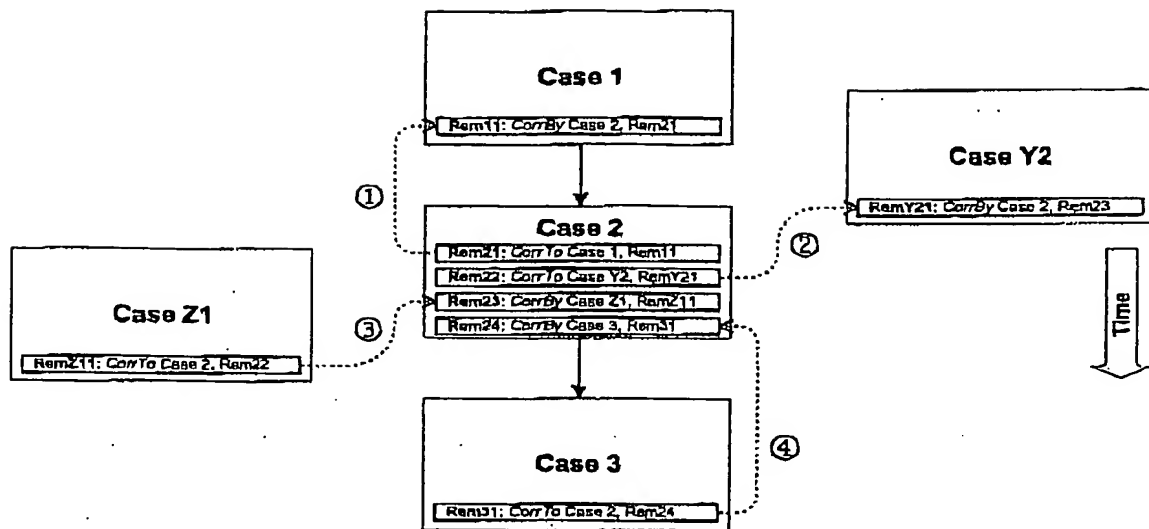relation with the initial data object.

        (Figure 4)
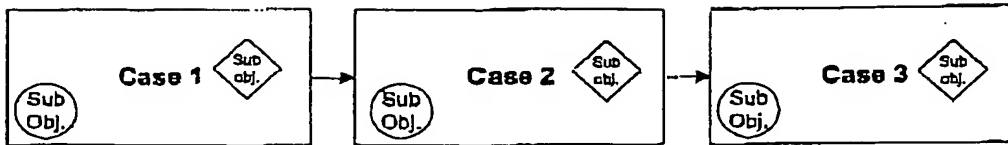
Fig. 1
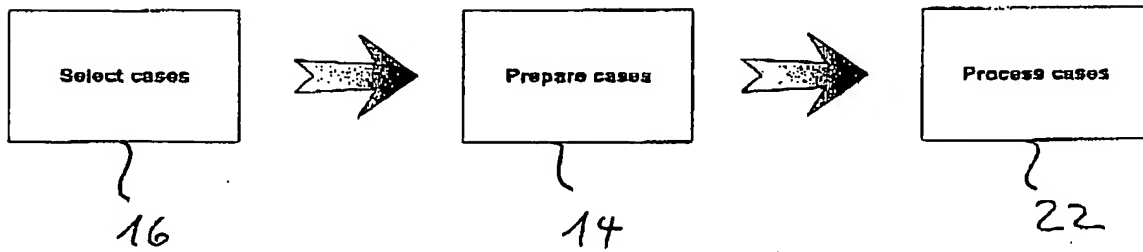
Fig. 3

Fig. 2

Fig. 4

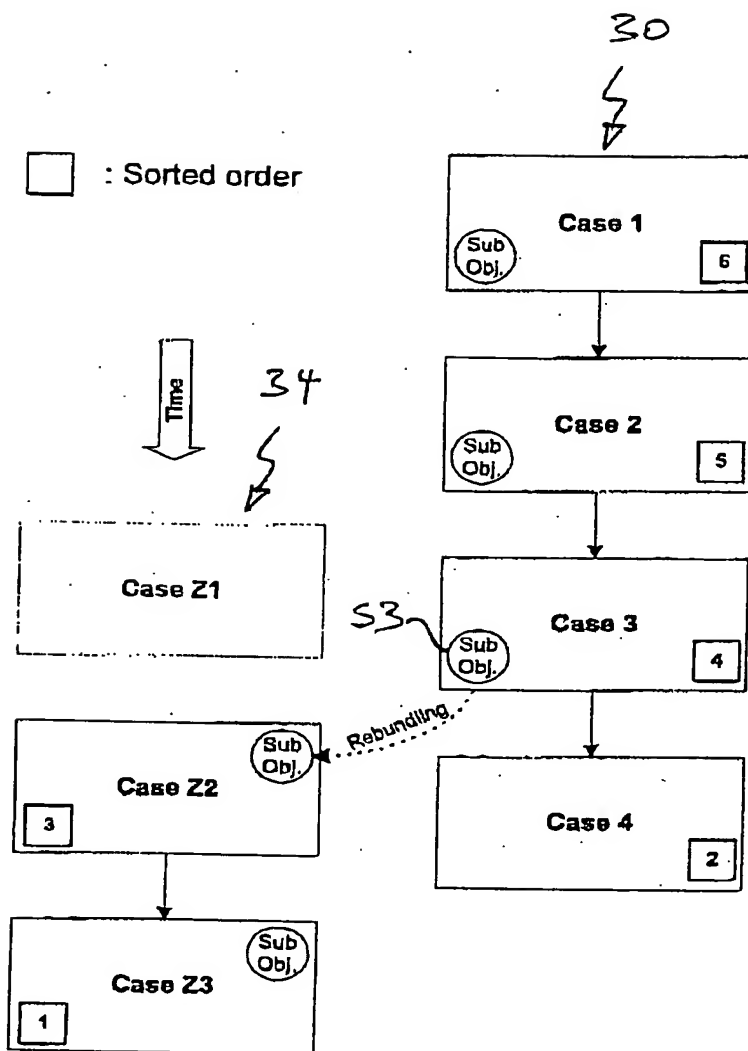| Initial case to update	Tasks
Case 4	PARK: 4 RESOLVE: 4
Case 3	PARK: 4, Z3, Z2, 3 RESOLVE: 3, Z2, Z3, 4
Case 2	PARK: 4, Z3, Z2, 3, 2 RESOLVE: 2, 3, Z2, Z3, 4
Case 1	PARK: 4, Z3, Z2, 3, 2, 1 RESOLVE: 1, 2, 3, Z2, Z3, 4

Fig. 5

Fig. 6

30

☐ : Sorted order

| Case 1 |
Sub Obj.
6

Time

34

Case Z1

Case 2
Sub Obj.
5

S3
Sub Obj.

Case 3
4

Case Z2
Sub Obj.
Rebundling
3

Case 4
2

Case Z3
Sub Obj.
1

Fig. 7